

LAWRENCE LIVERMORE REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, July 11-15, 2011

Stars in the sky come down to Earth



The NIF target chamber

Scientists working with the largest laser in the world are planning to create the smallest star on Earth.

The 192-beam National Ignition Facility at the Laboratory is the largest and most energetic laser on Earth. Built to achieve nuclear fusion in the lab, NIF is essentially creating a miniature star on Earth. "The system already has produced 25 times more energy than any other laser system," NIF Director Ed Moses said.

NIF's 192 beams are housed in a 10-story super-structure and travel roughly the length of three football fields from the originating master oscillators to the center of the target chamber.

NIF scientists hope to achieve fusion in 2012.

To read more, go to the [Web](#).

No batteries required



The sensor is about 2 millimeters in size.

Unlike many conventional chemical detectors that require an external power source, Laboratory researchers have developed a nanosensor that relies on semiconductor nanowires, rather than traditional batteries.

Now the Lab is looking for a company to license the technology. The device overcomes the power requirement of traditional sensors and is simple, highly sensitive and can detect various molecules quickly. Its development could be the first step in making an easily deployable chemical sensor for the battlefield.

The device is small enough that it could have applications in chemical and biological weapons detection programs or the medical field.

To read more, go to the [Web](#).

Supercomputer sees green



BlueGene/Q, which will be deployed at the Laboratory in 2012 as Sequoia, has been listed on the bi-annual Green500 list as the world's most efficient supercomputer.

As part of the Lab's mission to ensure the safety, security and reliability of the nation's nuclear deterrent, the Advanced Simulation and Computing (ASC) Program provides leading-edge, high-end simulation capabilities through supercomputing. The Lab's ability to model the extraordinary complexity of nuclear weapons systems is central to U.S. national security and essential to establish confidence in the performance of the aging stockpile without additional testing.

The Green500 has been compiled since 2005 by computer scientists and engineers at Virginia Tech to emphasize energy efficiency as an important component of supercomputing performance, in addition to speed as measured in floating point operations per second (FLOPS).

To read more, go to the [Web](#).

Coming to LIFE



The July/August 2011 issue of *Science & Technology Review* is now [online](#). This issue's feature article, "Igniting Our Energy Future," reports on how Livermore researchers are forging a commercial pathway for a revolutionary power plant called LIFE to help the nation meet the increasing demand for safe, clean and sustainable electricity.

Also included are highlights of five Tier-1 Grand Challenge projects awarded to teams studying a wide range of high-energy-density physics topics on the Laboratory's high-performance computing machines.

To receive an e-mail notice when a new issue is available online, send a [request](#) to *S&TR*.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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